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Editor's Note

Early morning frost clings to the hardy plants that remain in the Gifford Garden, and the Institute's grounds are covered in winter's first blanket of snow. The grounds staff has set up a bird feeding tree, with an array of delicacies. The combination of bare trees and hungry birds makes it an excellent time to view our avian visitors.

There are many pathways to learning about ecology. Some people find a passion for the natural world through an engaging teacher or mentor. Others will have their imaginations sparked by reading a newspaper article or purchasing an Earth-friendly product. By participating in the Poughkeepsie Journal's new Environment Page, Institute scientists hope to reach a new community of learners. The IES Ecology Shop encourages visitors to think about the origins of products and the impacts of consumption, another opportunity for education.

The *IES Newsletter* is published by the Institute of Ecosystem Studies, located at the Mary Flagler Cary Arboretum in Millbrook, New York.

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Where Has the Gypsy Moth Gone?

By Clive Jones, Ecologist,
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In 1869, imported silk was popular but expensive. Etienne Trouvelot thought he could make money crossbreeding sensitive silk moths with hardy European gypsy moths that would survive our cold climate.

His breeding experiments failed, he did not make his fortune, but our forests paid a high price for the few gypsy moths that escaped from his backyard in Medford, Massachusetts.

The insect spread. Young caterpillars ballooned in the wind on silken threads, and egg masses hitched a ride on vehicles and garden items when people moved. Over a century later, the moth has wandered north into Canada, west to the Great Lakes, and south to Virginia.

Ten year cycles

Every ten years or so, moth populations increase rapidly, sometimes to millions of caterpillars per acre. Once they strip oaks bare of their leaves, the caterpillars feed on other trees, including conifers. Oaks can withstand a year of complete defoliation, but are often killed by successive years of heavy damage. A single defoliation kills conifers.

Eventually, lack of food, a viral disease, and predatory insects kill most caterpillars, and the outbreak collapses.

Our long-term studies at the Institute of Ecosystem Studies in Millbrook show that moths are too rare most years to cause the widespread damage to trees like they did in the past. Two unlikely organisms – white-footed mice and a fungus – have, to a large degree, kept moth populations in check.

Gypsy moths arrived in Dutchess County in the 1940s. In New York State, small amounts of defoliation occurred in the mid-40s, increasing in the mid-50s, 60s and 70s.

Many will recall the massive outbreak of the early 80s when nearly 2.5 million acres of forest were defoliated statewide in both 1980 and 1981. Outbreaks reoccurred in the early 1990s and the turn of the new century, but



Gypsy Moth caterpillars, ubiquitous in the 1980s, were seldom seen in 2003

with much less defoliation.

Since the end of the 1980s outbreak, the gypsy moth seems to have receded into the background. Is it becoming an innocuous forest occupant or will it periodically resurge?

In all but three years since the 1980s outbreak, caterpillar densities have been well below levels that could cause serious damage to trees. In some years, moths have been so scarce that we found only one or two egg masses after searching acres of forest.

We now understand why moths are usually rare. Intriguingly, the very oak trees gypsy moths eat indirectly prevent moth outbreaks by co-opting the help of the white-footed mouse.

Mice depend on oak acorns for food; mouse populations increase dramatically the year after a bumper acorn crop. Mice are also voracious predators on moth pupae. In summers following a fall with acorns, mice consume most moth pupae before they get the chance to emerge as adults and lay eggs. This keeps moth populations in check, preventing outbreaks.

When acorns are scarce, mouse populations decline, fewer moth pupae are preyed upon, and moth populations start to rise rapidly. When acorn crops remain low for more than a year or two, moth populations can rise to levels where mice can no longer control them, even when mice become abundant again due to acorns.

Density, but not defoliation

This happened at IES in the early 1990s. Moth density rapidly increased over a two-year period, resulting in patchy, light defoliation in 1994. In

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Gifts That Give Back: The IES Ecology Shop

Sleek tagua nut figurines grace the shelves. A bounty of elegant etched gourds, available as ornaments or sleek jars, are on display. South African baskets, woven in vibrant hues, are ready for giving. A wealth of information on ecology, nature, and gardening lies waiting to be discovered on the bookshelves. From delicate porcelain flower pins to musical instruments disguised as frogs, the IES Ecology Shop is bursting with engaging merchandise.

For the past two and a half years, Visitor Services Coordinator Luanne Panarotti has been managing the shop. Under her guidance, with help from Visitor Services Assistant Ginny Fidler and a suite of staff members and volunteers, the merchandise has evolved from traditional gift shop fare to an array of unique Earth-friendly products. From hard-to-find gardening tools to garden sculptures made from recycled oil drums, Ms. Panarotti strives to engage shoppers of all ages in ecological inquiry. By encouraging consumers to think about the origins of products, and promoting merchandise that nurtures the Earth and the mind, the IES Ecology Shop helps enrich the visitor experience.

When buying new merchandise, Ms. Panarotti focuses on four groups of products: recycled merchandise, sustainable merchandise, socially responsible merchandise, and wood products from companies that participate in reforestation programs. Vibrant wire bowls, woven from telephone wire, are an example of both reclaimed and socially responsible merchandise. The bowls, with their spirals of color, are made by a cooperative of South African crafters using discarded phone wire. Wires that once facilitated communication are transformed into conversation pieces. Beautiful in their own right, the sale of the bowls helps encourage clever recycling.

Ms. Panarotti describes sustainable merchandise as, "Products made from renewable



A tagua nut seal figurine

forest resources harvested in a sustainable manner without damaging forest ecosystems. These can be non-timber forest resources such as nuts, fruits, seeds, and rubber, as well as wood products that are responsibly harvested from managed forests." By creating a market for these products, stores like the Ecology Shop create an economic incentive for indigenous communities to conserve their natural resources rather than destroying habitats for activities like cattle ranching or timber extraction.

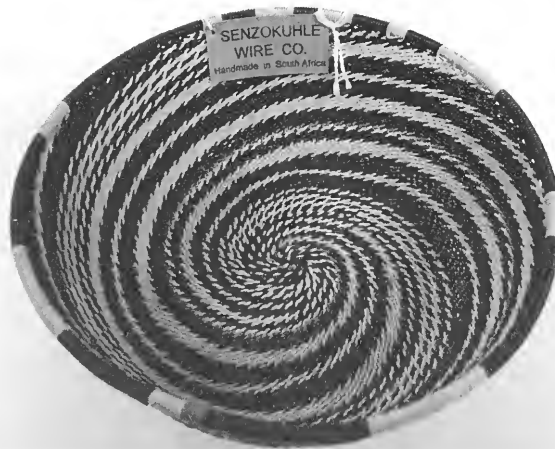
Sculptures carved out of tagua nut are an excellent example of a sustainable product. Called "vegetable ivory," tagua nuts are from the Tauga



The Ecology Shop offers a range of intricately carved gourd boxes, handmade in Peru

palm tree (*Phytelephas equatorialis*), which grows in the South American rainforest. Gathered when they fall to the ground, tagua nuts are a renewable resource produced by living trees, thus encouraging sustainable forestry practices. The nuts take 3-8 years to form. When dried, the insides of the brown nuts become a dense milky white. Artisans cut and polish the nuts until the final product resembles an ethical alternative to animal ivory. "The end result," remarks Ms. Panarotti, "is a charming figurine from a company that encourages rainforest health and the sensible use of natural resources."

The etched gourds sold at the Ecology Shop provide an unlikely canvas for intricate nature scenes. Made in Peru, the gourds are sustainably harvested, dried, and painstakingly adorned by



Crafted out of phone wire, these decorative bowls provide financial independence to women in South Africa

skilled artisans. Some feature tropical birds and jungle animals, while others depict insect life. Smaller ornaments are perfect for holiday decorating, while the larger lidded vessels make beautiful keepsake boxes. Ms. Panarotti notes, "When we introduced them last winter, they were one of our best sellers. When you buy a Lucuma gourd you get a stunning piece of craftsmanship while also supporting traditional crafts."

Another example of sustainable merchandise is the stationary sold at the Ecology Shop. Several of the lines offered are produced using paper from annual plants, such as kenaf and hemp, instead of trees. Panarotti notes that, "The advantage of annual-based paper is that it is much easier, both mechanically and chemically, to extract fibers from annuals than from trees. Plants like hemp have longer fibers, which means they can be recycled more times than tree-based paper."

Some products are sustainable because of how they are made and not what they are made of. Traditionally, coffee was grown beneath a canopy, with the canopy supporting wildlife while mitigating the effects of severe rain and sun. With the advent of chemical fertilizers and pesticides, most modern coffee plantations have eliminated canopy trees in favor of increased crops. The environmental costs incurred, including the destruction of bird habitat and pesticide contamination, have been severe. The Ecology Shop offers shade-grown coffee by Thanksgiving Company; proceeds of the Bird Song Blends help fund American Birding Association Programs.

The elegant wooden boxes sold in the Ecology Shop are handcrafted by Heartwood Creations, a company that participates in reforestation. Since 1990, the company reports that donations have led to the plant-

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Gypsy Moth, *continued from page 1*

contrast to the 1980s outbreak however, the moth population rapidly declined with no further defoliation.

The difference was the unexpected appearance of a fungus that killed most of the caterpillars before they could strip the forest. This fungus showed up again in 2000, curtailing another outbreak.

Originally introduced from Asia to control gypsy moth, the fungus was released in Boston in 1910 and 1911 and in Pennsylvania in 1985. When and how it arrived in the Hudson Valley is unknown, but it was not detected at IES in the 1980s outbreak.

Will the fungus prevent moth defoliation in the future? We don't know. Fungi tend to thrive in wet conditions, which prevailed in 1994 and 2000. If this fungus always needs wet summers to kill moths, then there can be no guarantee that it will suppress every outbreak.

Coast isn't clear

Even if the mice and the fungus do keep the moth in check, this is not the end of introduced pest and disease problems in Hudson Valley forests. Joining chestnut blight and Dutch elm disease of the past are newly arrived beech bark scale and canker, and the hemlock woolly adelgid. Looming on the horizon but yet to get here are the Asian longhorn beetle and sudden oak death.

As long as we fail to prevent accidental introductions, our forests will face uncertain, unpredictable futures. ●

Ecology Shop, *continued from page 2*

ing of over 100,000 native hardwood trees. The trees are primarily planted in restoration sites. By implementing a 'self-imposed tax,' and planting five trees for every one tree used, Heartwood Creations mitigates the impact of their consumption. The business also provides seedlings to local scouts and schools for planting in their communities.

Certification organizations help shop owners like Ms. Panorotti locate Earth-friendly products. Backed by 14 major environmental organizations, The Forest Stewardship Council (FSC) offers independent certification of ecologically, socially, and economically well-managed forest products. "The great thing about the FSC," remarks Ms. Panorotti, "is that it verifies claims from the forest all the way to the final product."

"When buying Earth-friendly products, I am also concerned about how workers are treated," Ms. Panorotti comments. Adding, "I try to

IES Celebrates: The Odum Award, The Blue Planet Prize & The ECI Prize

This year the Institute garnered a number of distinctions, among them several prestigious academic awards. This August, the Ecological Society of America awarded Dr. Alan R. Berkowitz the Eugene P. Odum Award for Excellence in Ecological Education. The award recognizes Dr. Berkowitz's contributions to the field of ecology education



(L-R) Award recipients Drs. Alan R. Berkowitz, Gene E. Likens, and Jonathan J. Cole

over the past 17 years. In October, Institute Director Gene E. Likens was presented with the Blue Planet Prize at an awards ceremony in Tokyo, Japan. He and his long-time collaborator Dr. F. Herbert Bormann were co-recipients of the award, celebrating their pioneering research at the Hubbard Brook Experimental Forest in New Hampshire. Awarded by the Asahi Glass Foundation, the prize recognizes scientific research that helps solve global environmental problems. Finally, Dr. Jonathan J. Cole was this year's recipient of the International Ecology Institute Prize (ECI). The ECI Prize honors Dr. Cole's contributions to aquatic biology and requires him to serve science and society by writing a book. In the words of his presenters, "Jonathan Cole has a proven ability to synthesize his own work and that of others, melding a wider, integral understanding of the ways in which lakes function. He is among the true leaders of contemporary ecology."

support vendors that are members of the Fair Trade Federation (FTF), an association of fair trade wholesalers, retailers, and producers committed to providing fair wages and employment opportunities to economically disadvantaged artisans and farmers worldwide."

Ms. Panorotti also seeks out products from vendors that belong to The Crafts Center, an international, nonprofit organization that enables low-income artisans to develop successful businesses. Their mission is based on the assumption that: "viable craft businesses stimulate local economies, preserve centuries-old cultural traditions, prevent migration by poor families to overcrowded urban centers, and contribute to the conservation of raw materials, which maintain often fragile ecosystems."

Filling a shop with Earth-friendly products is a labor of love that involves careful ordering and fact checking. Ms. Panorotti's efforts have created a shop full of gifts that give back

economically and socially. Panorotti remarks, "The products have two-fold advantage, they serve to protect resources and they educate the consumer about environmental issues. Once you become aware of the way ecosystems work, you cannot ignore the fact that humans have had a significant negative impact on their functioning, and that it is important to find ways to tread more lightly on the planet."

This holiday season; consider dropping by the shop and browsing through the merchandise. The products suit a range of ages and interests, from toddlers to adults. Visitors are sure to leave with unique gifts and a greater understanding of how consumer choices impact the environment. ●

The Ecology Shop's success is made possible through the dedication of its core and volunteer staff, among them Ginny Fidler, Rosemarie Pelish, Alison Camp, Vickie Raabin, Susan Eschbach and volunteers Joan Sears and Andre Giglio.

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Newsletter

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CONTINUING EDUCATION

The Continuing Education Program is now accepting winter registrations. For information, or to request a brochure, call 845-677-9643 or visit www.ecostudies.org/education/continuing.html. Winter semester programs include:

Biology

Jan. 4 (4 Sat.): Introduction to Botany

Gardening

Jan. 25 (1 Sun.): Invasive Plants in the Garden

Jan. 31 (2 Sat.): Growing Fruit

Feb. 3 (4 Tues.): Principals of Propagation

Feb. 8 (1 Sun.): Using Grasses in the Garden

Feb. 28 (1 Sat.): Introduction to Turfgrass

Landscape Design

Jan. 8 (5 Tues.): Principals of Landscape Design

Jan. 21 (5 Wed.): Advanced Illustration Drawing:

Improving Your Graphic Skills

Feb. 29 (1 Sat.): Native Perennials in the Garden
Landscape

Natural Illustration

Jan. 25 (5 Sun.): Gouache: Enhancing Botanical Illustrations

Jan. 30 (Fri., Sat., Sun.): Drawing the Greenhouse: An Intensive Weekend

March 15 (1 Fri., 1 Sat., 1 Sun.): Illustrating with Pen and Ink: Intensive Weekend

HOURS

Winter Hours: October 1 - March 31

Internal roadways and trails closed during deer hunting season, and when snow covered.

Public attractions: Mon.-Sat., 9-4, Sun. 1-4; closed public holidays. The greenhouse closes at 3:30 daily. The Ecology Shop: Mon.-Fri., 11-4, Sat. 9-4, Sun. 1-4. (Please note: The shop is closed Mon.-Sat. from 1-1:30.)

Free permits are required and are available at the Gifford House Visitor and Education Center until one hour before closing time.

Calendar

IES SEMINARS

Free scientific seminars are held at 11 a.m. on Fridays in the auditorium from September until early May.

Dec. 12: Tribulations and trade-offs: the influence of predation pressure on the size and behavior of mayfly nymphs. Dr. Lee Ann Martinez, University of Southern Colorado (Director's Program for Visiting Scientists).

Jan. 16: Helping Students Understand the Nature of Causality Implicit in Scientifically Accepted Explanations: An Overview of the Understandings of Consequence Project. Dr. Tina Grotzer, Harvard Graduate School of Education.

Jan. 23: "Do models of phytoplankton-nutrient relationships developed in temperate waters apply in Brazilian waters?" Dr. Vera Huszar, Universidade Federal do Rio de Janeiro

THE ECOLOGY SHOP

New items in The Ecology Shop. Woodstock wind chimes; handcrafted brooms from Berea College; slate, copper and river stone items from Vermont; pewter jewelry; new garden tools; and much, much more! Senior Citizens Days: 10% off on Wednesdays.

VOLUNTEER EDUCATORS

We currently have opportunities for volunteer educators to participate in our Ecology Field Programs for schools. If you are interested in assisting the program leader with programs including Plant Power, Maple Sugaring, Watershed Studies, or Fantastic Forests please contact Susan Eberth at 845-677-7600 ext. 316. Training is provided.

GREENHOUSE

The Greenhouse is a year-round tropical plant paradise and a site for controlled environmental research. The greenhouse is open daily until 3:30 p.m. with a free permit (see HOURS).

MEMBERSHIP

Join the Institute of Ecosystem Studies. Benefits include subscription to the IES Newsletter, member's rate for courses and excursions, a 10% discount on IES Ecology Shop purchases, and participation in a reciprocal admissions program. Individual membership: \$40; family membership: \$50. Call the Development Office at 845-677-7600 ext. 120.

The Institute's Aldo Leopold Society

In addition to receiving the benefits listed above, members of The Aldo Leopold Society are invited guests at spring and fall IES science updates. Call the Development Office at 845-677-7600 ext. 120.

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... IES website: www.ecostudies.org

For information on current IES public events and attractions, visit: www.ecostudies.org/ThisWeek.html.

For garden tips, visit: www.ecostudies.org/gardens.html.